Femtosecond Magnetism

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Magnetism is a collective phenomenon involving correlated electrons. The relevant interactions in magnetic solids such as exchange, spin-orbit and electron-phonon coupling are of various strength and lead to different characteristic time scales for energy transfer between orbital, spin and lattice degrees of freedom. In this talk an overview will be given how pump-probe experiments using optical fs-lasers offer unique possibilities to investigate the ultra fast spin dynamics following a fs excitation of the electronic system. Such studies are of direct relevance for establishing the ultimate time scale for magnetic switching in future data storage devices. The availability in the near future of fs soft x-ray pulses offering element and orbital sensitivity is expected to revolutionize this field.